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## Older Moms Deliver: How Increased Births to Older Mothers are Impacting School Enrollment

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# Older Moms Deliver



## How Increased Births to Older Mothers Are Impacting School Enrollment

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Population Research Center  
Portland State University



Southern Demographic Association  
Williamsburg, Virginia  
October, 2012

Charles Rynerson is the school demographer for our center and I am a retired guy who has the time to muck

around with the data.

## What this research is about

- It is an outgrowth of our demographic support for Portland Public Schools, the **backstory** to our enrollment forecasts.
- It attempts to dissect the linkages between gentrification, increased births to older mothers, and the turnaround in the District's enrollment.
- It illustrates the use GIS tools to analyze highly localized demographic changes.

The purposes of the talk are to:

1. Shed some light on social processes in Portland
2. Provide a look at how GIS and demographic tools can be used to dissect complicated issues

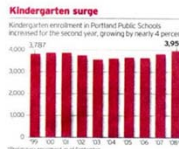
- A Portland Oregonian newspaper article in Fall 2008 noted the increase in kindergarten enrollments.

- What factors lay behind this upturn, especially in parts of the District where enrollments have been declining for years?

## Finally, a bumper crop of Portland kindergartners



The boys in Dana Jacobson's kindergarten class at Lewis Elementary line up for a midmorning bathroom break.



### The growing enrollment is welcome, albeit unexpected

By KIMBERLY MELTON  
THE OREGONIAN

Leaders of the state's largest school districts have waited for a sign that they're starting to recover from a decade of decreasing enrollment losses. They just got it: Portland Public Schools posted the highest student numbers in 12 years, bolstered by growth in kindergarten classes. The preliminary count ended up at 40,241 students from pre-kindergarten through 12th grade.

"We anticipated higher numbers, but we didn't expect quite this much growth," said Tim Lant, principal at Lewis Elementary School. His school in Southeast Portland gained 24 more kindergartners this year compared with last fall — one of the district's largest kindergarten increases. Kindergarten rolls jumped nearly 130 students over last year — essentially the same number as the district-wide gain.

Kindergarten enrollment is a harbinger for growth in school districts and often is used to gauge enrollment demands.

Portland and other metro-area districts will likely experience kindergarten increases in the coming years, said Charles Ryterson, a demographic study at Portland State University's Population Research Center.

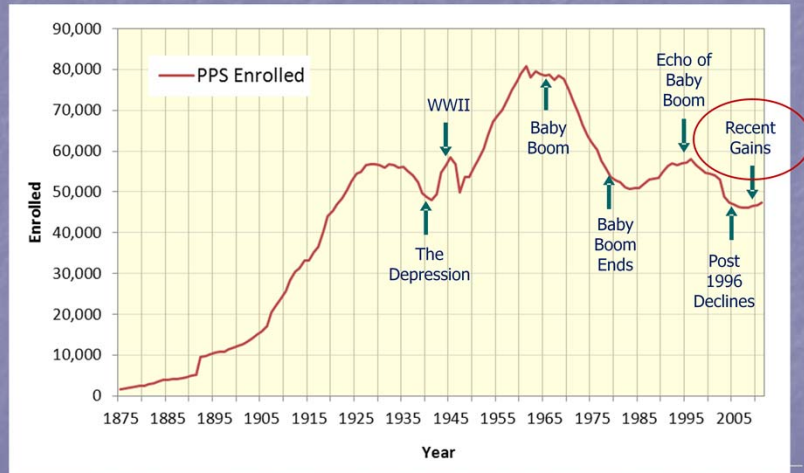
Birth rates have begun increasing in Oregon and across the country, potentially bunting a steady increase in school-age students, Ryterson said.

Other districts across the metro area also posted big kindergarten gains, though a couple posted losses. A sampling of enrollment and percent change:

School district	2008 enrollment*	2007 enrollment	Percent change
Capital Fusion	524	505	3.8
Beaverton	2,775	2,607	6.4
North Clackamas	188	190	6.1
Reynolds	892	854	4.4
Portland	3,990	3,863	3.3
David Douglas	787	766	2.7
Vancouver	1,567	1,544	1.5
Evergreen	1,789	1,774	0.8
Gresham	747	777	-3.9
Lake Oswego	350	365	-4.1

Everyone was a bit surprised that in the Fall of 2008 kindergarten enrollment showed growth, after a number of year of decline.

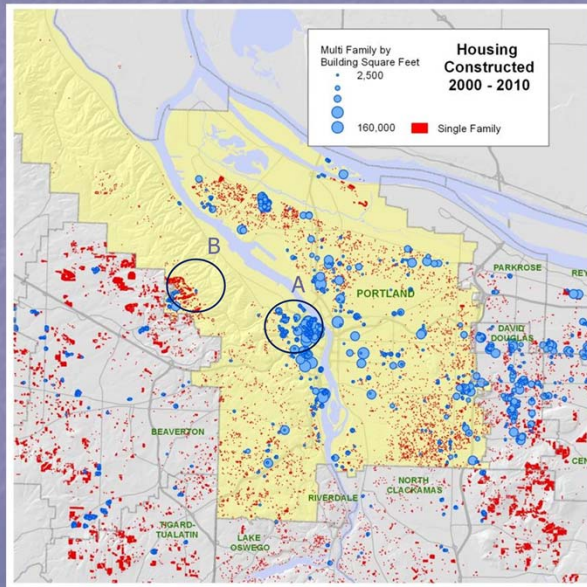
## The ups and downs of enrollment



The District' enrollment peaked at nearly 90,000 during the Post WWII baby boom, again 25 years later with the “echo of the baby boom” and has declined since.

## Housing in the Portland Public Schools District

- Most of the single family building permits were issued for areas outside of the District (in yellow)
- The multifamily units in the core area (A) of the District house few school age children
- Other than the Forest Park area (B), single family construction has had a modest impact on the District's enrollment. Many of the students in post 2000 housing reside in recently built income qualified housing.



Portland school district is like many metropolitan school districts in that it occupies the built-out core and is subject to the dynamics of the metropolitan housing market –

where the housing for families with kids gets built

and how residents respond to central city versus suburban

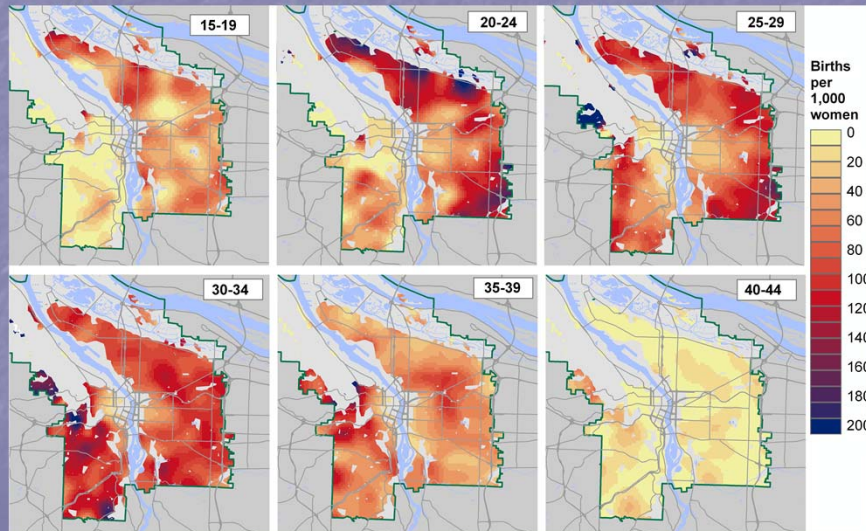
living opportunities.

Think Seattle, San Francisco.



## Age Specific Fertility Rates in 2000

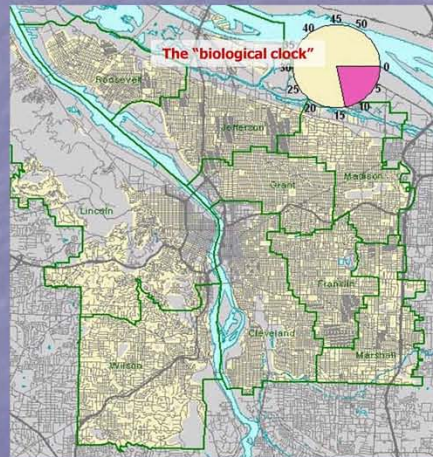
the Spatial Nature of Birthrates



We start our analysis of the “older moms” phenomena by looking at where in the District the births to younger and older mothers occurs.

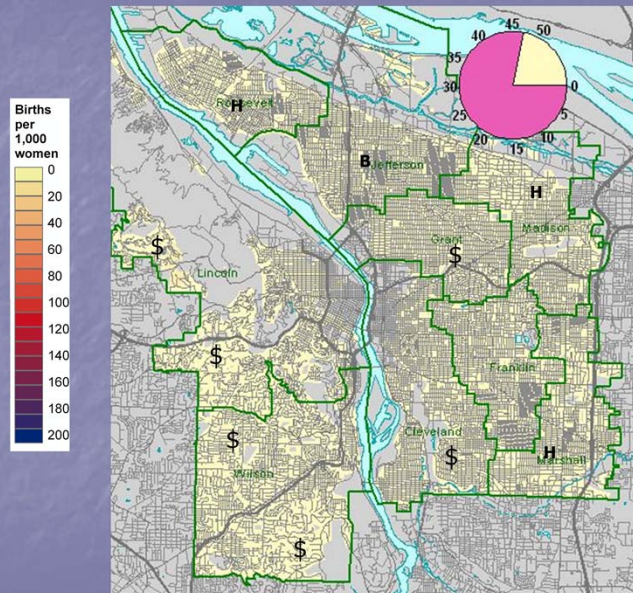
## Age Specific Fertility Rates

- Age Specific fertility - the numbers of births by age of mother.
- The time dimension here is the age cohort of women
- The clock with the rose sector shows birth rates for the age cohort



## Age Specific Birth Rates – Animation

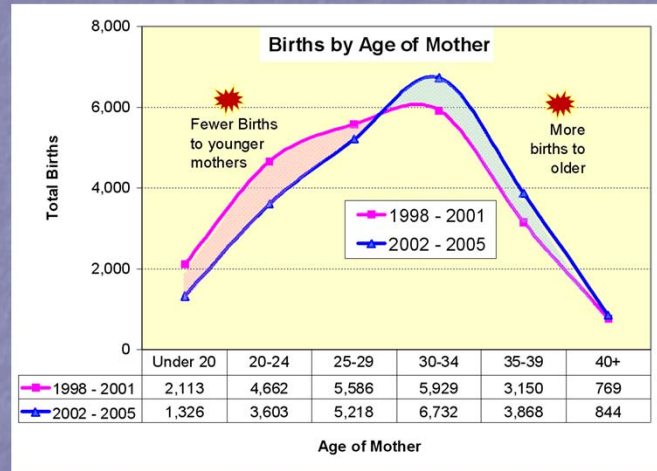
- Income and ethnicity impact birth rates
- Minority mothers are younger H, B
- Affluent mothers are older \$



The animation shows that there is a distinctive geography for births to younger and older mothers and that it appears to be related to the location of minority populations, mainly Black and Hispanic, and the degree of affluence of neighborhoods.

## The Crossover in births by age of mother

- In 2001 the number of births in the District to older (age 30+) mothers
- equaled those to younger mothers (under age 30)
- Total births stayed about the same



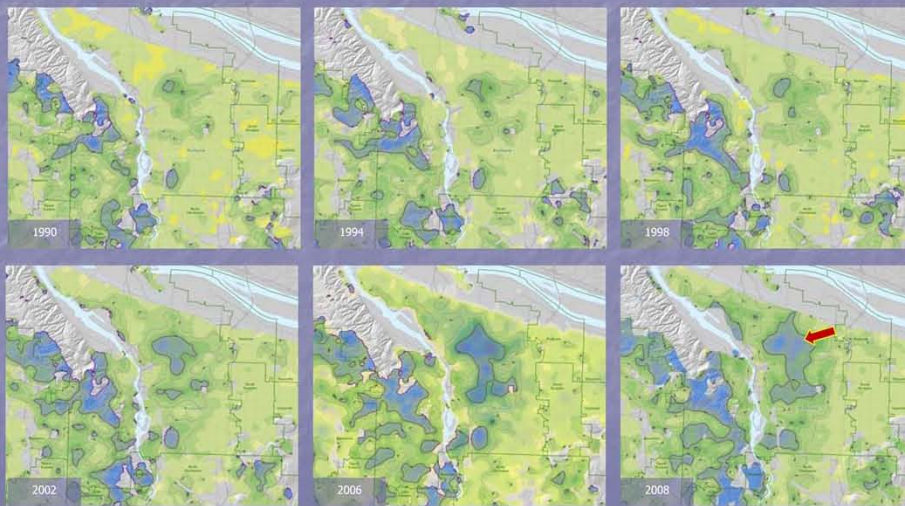
Looking at the five years after 1996 and the five years after 2002 the decline in births to younger mothers has been approximately equal to the increase in births to younger mothers.

The total number of births changed little.



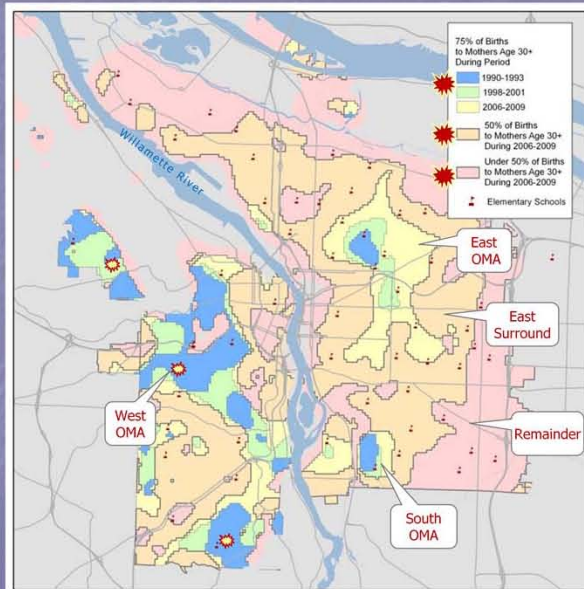
## Proportion of Births to Older Mothers

There was growth in the number of births to older mothers across the District, but that on the east side was mainly after 2000



## Regions used in subsequent analyses

- In the areas in blue, green and yellow 75% or more of the births were to mothers age 30+.
- The older moms area on the east side of the river is referred to as the **East OMA** and is the main focus of this paper.
- The **South OMA** and **West OMA** areas also will be discussed.
- Shown in light orange is a surrounding area in which 50% of the births were to mothers age 30+. This area is mainly on the east side of the river and will be referred to as the **East Surround**
- The remainder of the district, mainly on the east side of river is shown in salmon color
  - Referred to as **Remainder**



## Birth Regions Diagram

11,198 of the District's students reside in the three OMA areas, East, South, and West

Slightly more live in the East Surround (13,671)

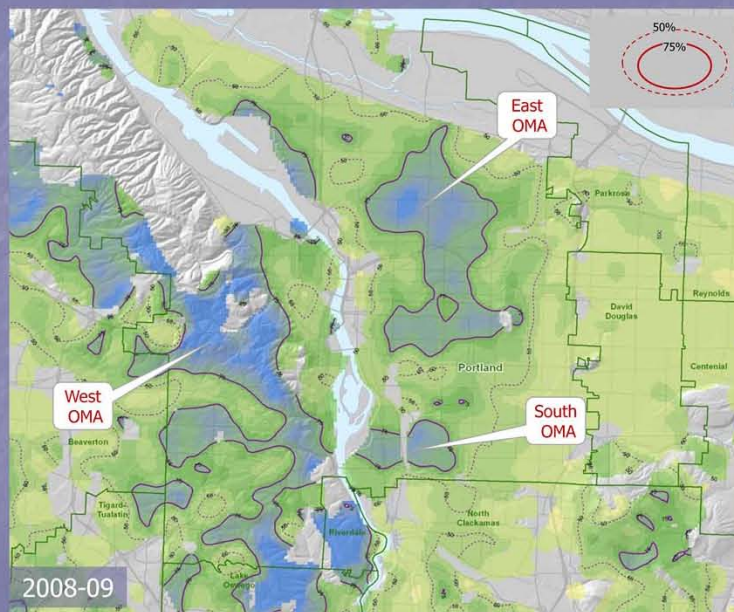
and in the remainder of the District (16,829).

**How important was the increase in births in the OMA areas to the turnaround in enrollment for the District?**

Births	Regions and 2010 Enrollment		
75% to age 30+ 1990-1993	East	South	West
75% to age 30+ 1998-2001	OMA	OMA	OMA
75% to age 30+ 2006-2008	(5,424)	(1,080)	(4,694)
50% to age 30+ 2006-2008	East Surround (13,671)		West Surround (3,563)
Under 50% age 30+ in 2006-2008	Remainder of SD 16,829		

Here is an animated version of the earlier map showing percent births to mothers age 30+.

- Note the expansion of the East OMA, especially compared to West OMA
- Who are the older moms?
  - Married late
  - Postponed having children
  - Highly educated





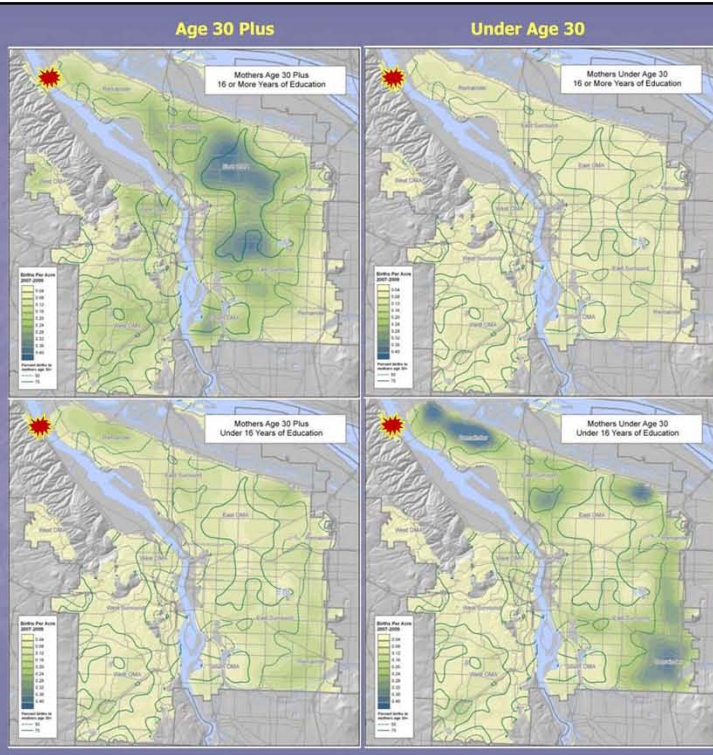
- The largest number of births were to highly educated older moms.

#### 16 Plus Years of Education

- The next largest were to less educated younger moms.

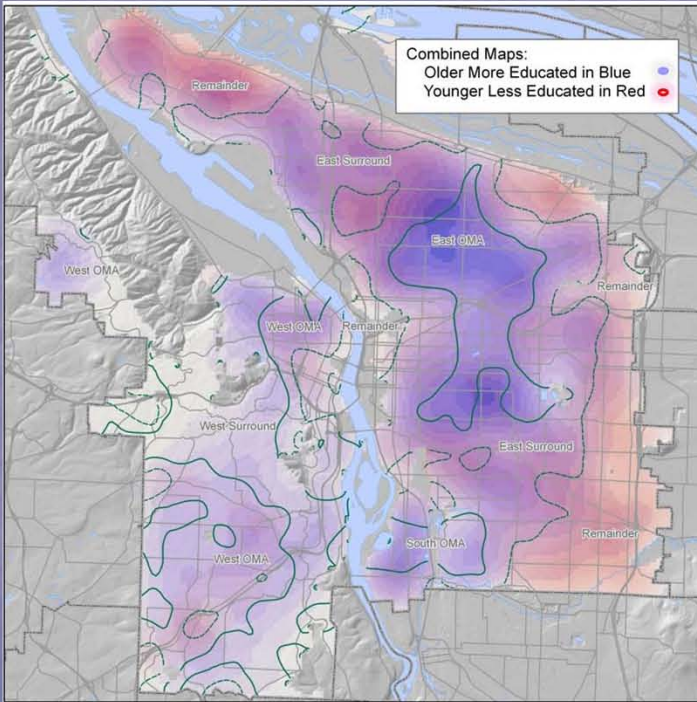
#### Under 16 Years of Education

- The two other maps show more educated young mothers
- and less educated older mothers



## Replay as animation

- The "older moms" area showing combination of age 30+ and baccalaureate or higher level education (42%).
- The other more numerous class of mothers under age 30 with less than baccalaureate level of education. This area include the areas with large Hispanic populations (31%).
- Mothers under age 30 with baccalaureate level of education. This map may echo a younger group of gentrifying households, but perhaps many of them are childless and not reflected here (10%).
- The group of older mothers age 30 plus with less than a baccalaureate education (16%).
- And finally, a combined map of older more educated and younger less educated mothers (73% of births).



## The analysis to follow

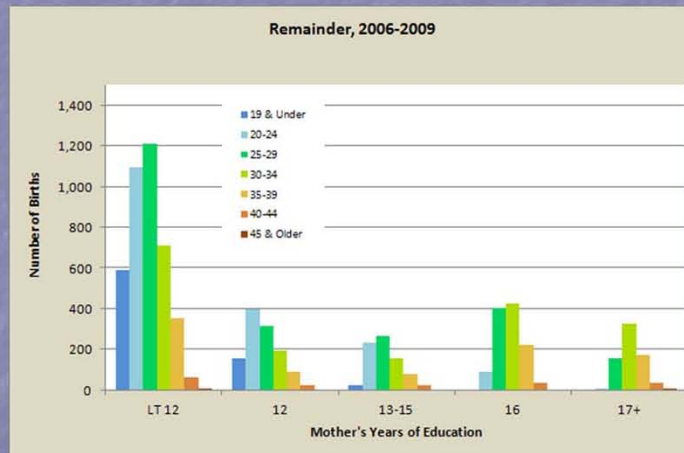
- Who were the older moms who moved into the OMA areas, particularly the East OMA? What do we know about them and their households that differentiates them from other birth mothers of the period?
- What can we learn from looking at the characteristics of the housing and inhabitants that will inform us as to what kind of gentrification process occurred here?
- Did the “older moms deliver”? Did the concentration of mothers age 30 plus in the OMA areas sufficient to turn around enrollment declines in schools in the impacted areas? Was this phenomena what caused the District’s enrollment to rebound?

## Who are the older moms?

- Tabular analysis based on linked birth record and tax-lot data
  - Birth record for mother - age, race, Hispanic, education
  - Tax-lot data for mothers residence – value, building square feet, structure type, tenure
- Gentrification indices following David Ley's work
  - Composite index of change in percent with college education and employed in managerial, technical, and professional occupations.
- Cartographic analysis of tax-lot and census data
  - Tax-lot data
  - Block and tract level data

## The older mothers are highly educated

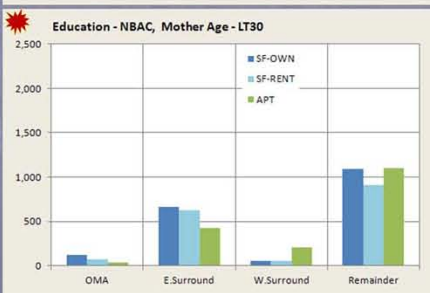
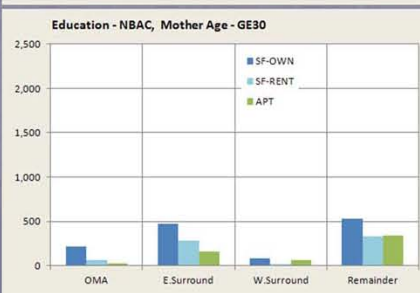
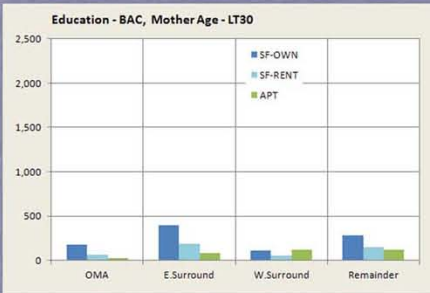
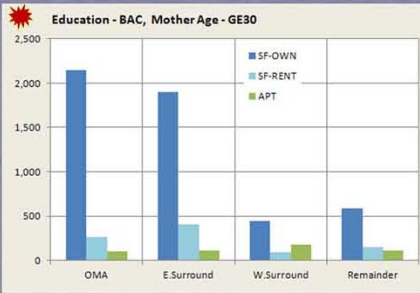
- Educational levels in the Portland district are relatively high.
- In the East, South, and West OMAs nearly all of the birth mothers have a baccalaureate degree
- In the areas surrounding the East OMA educational levels are rising
- But in the remainder of the District the majority of mothers have less than 12 years of education





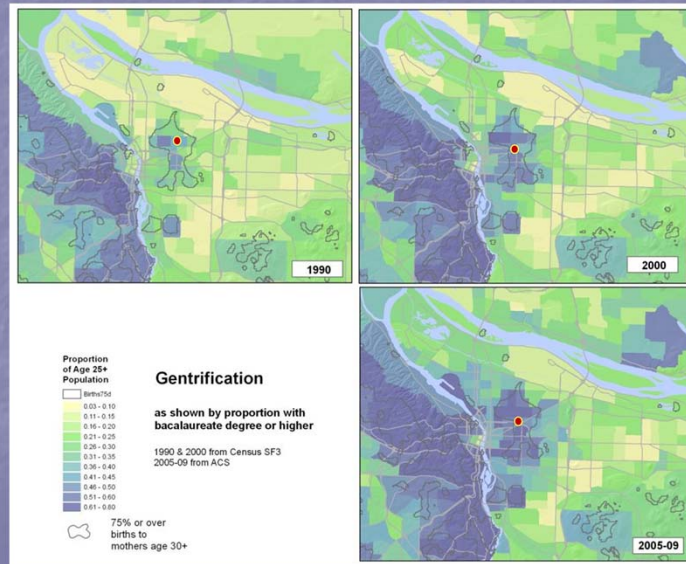
- In the OMA's the highly educated mothers mainly reside in owner occupied single family housing.
- The more educated mothers in the E. Surround area are similarly housed.

- The less educated mothers in the Remainder area are housed in approximately equal number in renter and owner occupied housing and apartments.



## Gentrification indices following David Ley Percent with 4 Year Degree or Higher

- This map is based on census and ACS data for 1990, 2000 and 2005-2009. It shows the percent with a four year degree or higher.
- The change in time in this measure is a common identifier for gentrification.
- Note how the proportion with a four year degree or higher grows outward from the East OMA



We argue that these over 30 moms are part of the tide of younger families who were involved in the gentrification of the areas of quality built pre 1930 built housing on Portland's east side.

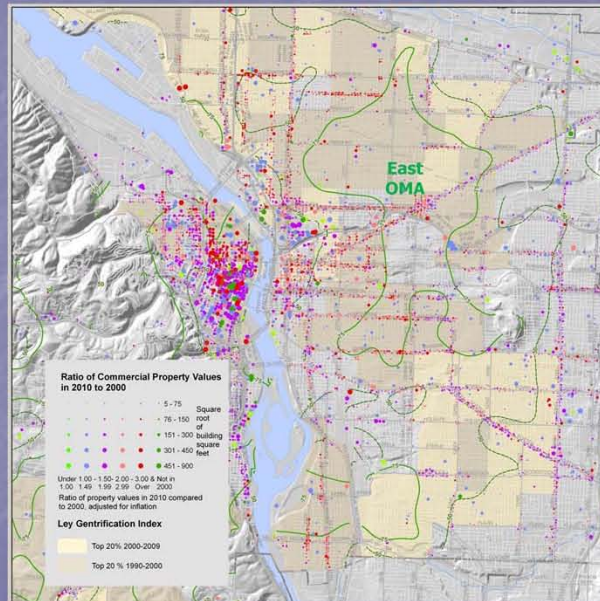
If we identify gentrification in Portland by noting those areas where the number with 4 year college degrees have increased,

a measure used by David Ley and others,

we see the coincidence with the birth focus areas.

# Gentrification based on Percent College Educated and Employed in MTP Occupations – following Ley, 1996

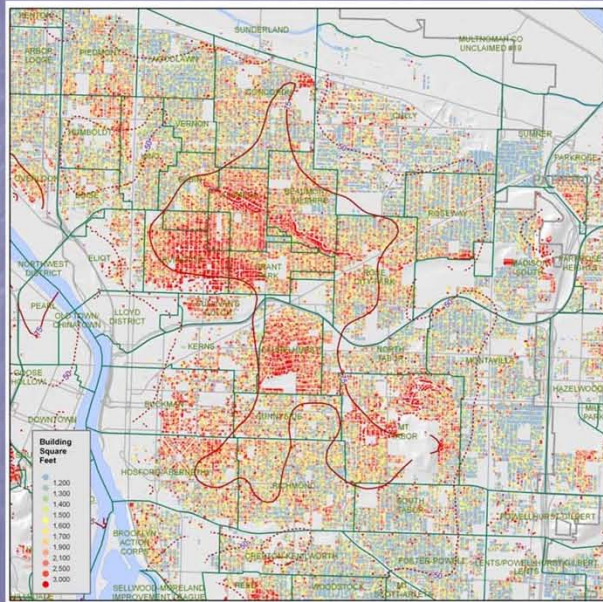
- From 1990 to 2000 the average change in proportion with college degree and employed in MTP occupations rose around the edge of the East OMA.
- From 2000 to 2008 the measure of gentrification spread out beyond the East OMA.
- Ley depicts gentrifying areas as being in the top 20% of tracts with respect to change in the composite education and MTP employment index.
- Values for commercial properties in and near the East OMA rose sharply from 2000 to 2010. Red symbols indicate over 300% increase





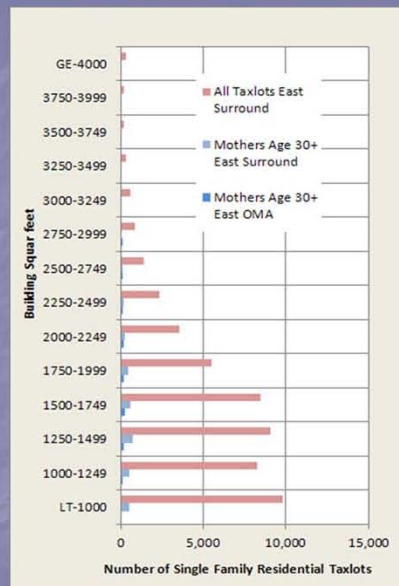
## The affluent, educated older moms command more spacious housing

- Other parts of the Portland School District include spacious single family housing, but on the older east side of the river they occupy a large share of this valuable housing..
- Zooming in to the **East OMA** the core Alameda, Grant Park, and, Laurelhurst neighborhoods were developed in the early 1900s with restrictions that favored large expensive houses.
- Moving outward from the **East OMA** into the **East Surround**, where some the developments were built to accommodate less affluent working class families, we see that there is considerable variability in building square feet.



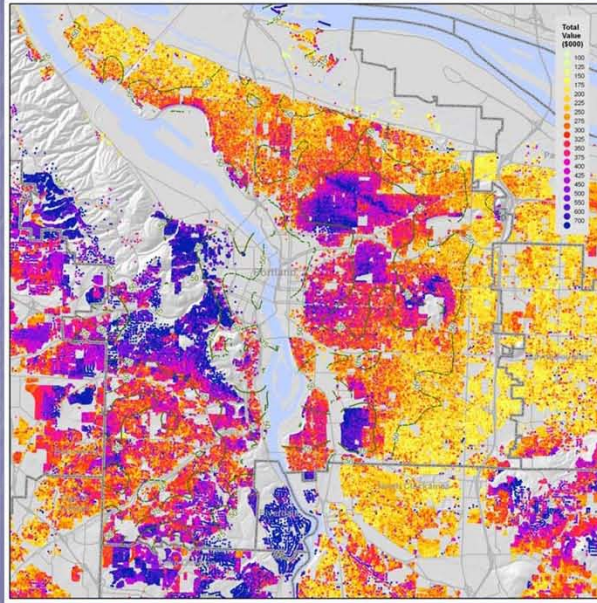
### Building Square Feet for Older Mothers East OMA, and East Surround

- Older mothers residing in the **East OMA** live in units par for the area in building square feet.
- Mothers, younger and older, residing in the **East Surround** area live in smaller single family housing units, also par for their area, but smaller than those for older mothers living in the East OMA
- The proportion of single family units in the **East Surround** occupied by older mothers (births 2007-2009) is small compared to the total number of units.



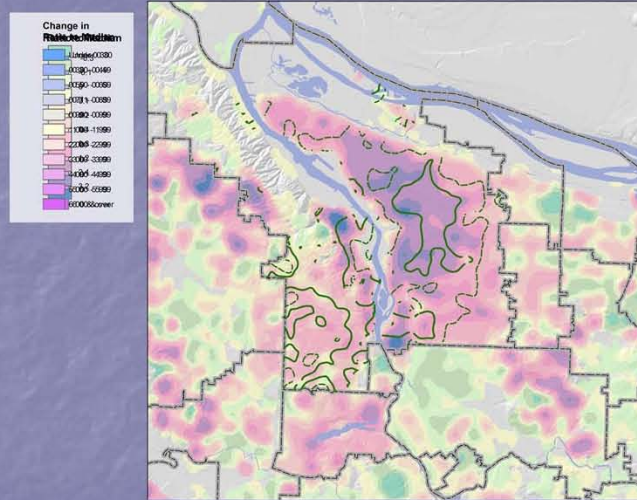
## Single Family Housing Values rose sharply in the East OMA

- In 2000 The East OMA offered housing opportunities for middle income families.
- By 2010 the price of new housing in this area had risen over \$350,000, causing middle income families to look farther out.



## Single family housing values compared to median

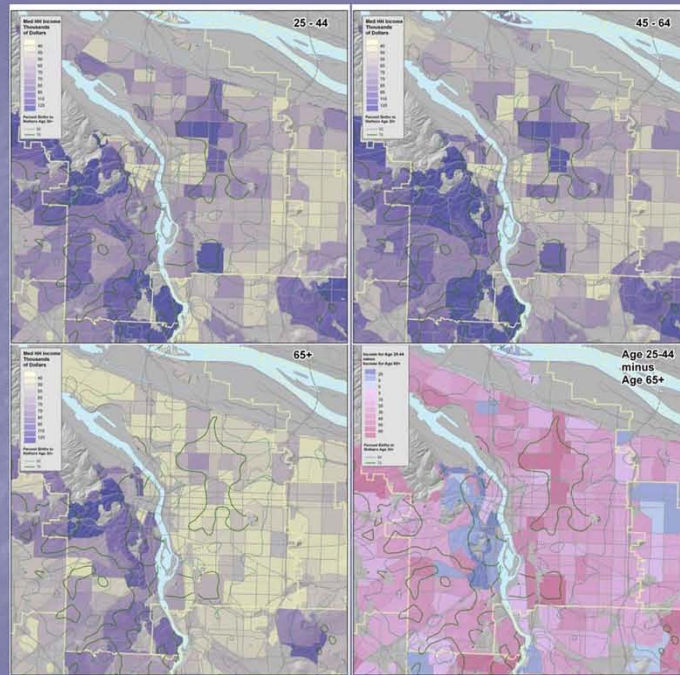
- In 2000 the core of the **East OMA** single family housing values were already well above the metropolitan median.
- By 2010 the area of above the median prices had spread to much of the east side of the District.
- The **East OMA** area showed some of the most rapidly escalating prices in the metropolitan area.





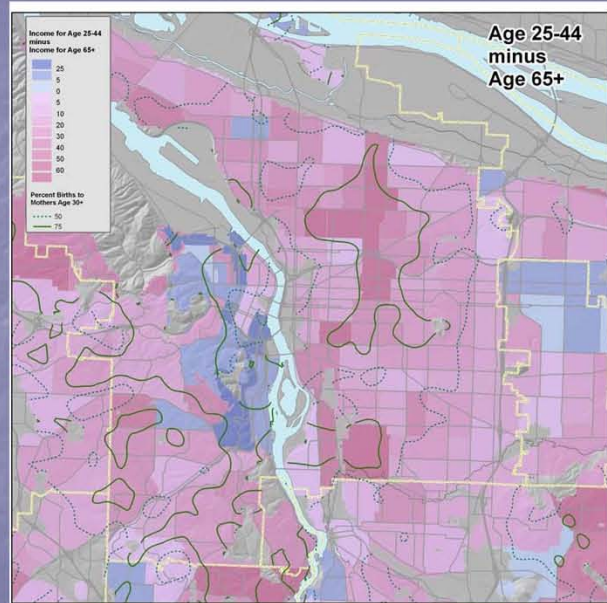
## Income by age data in map view

- The geographical patterns of income for the 25-44 and the 45-64 are similar.
- There is a large differential between the 25-44 and the elderly in the **East** and **South** OMAs.



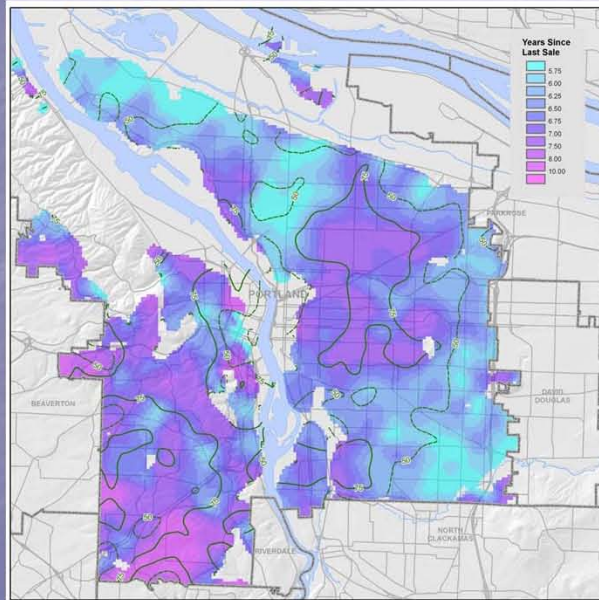
## Income by Age for OMAs

- The household income for in the East OMA for younger households, 25-44
- and middle aged , 45-64 was high, sufficient to cover the cost of the increasingly expensive housing.
- By contrast, the income of the 65 and older population was considerably lower than the in-migrating younger households.
- Many of the departing senior age families likely left with the value of their appreciated real estate.



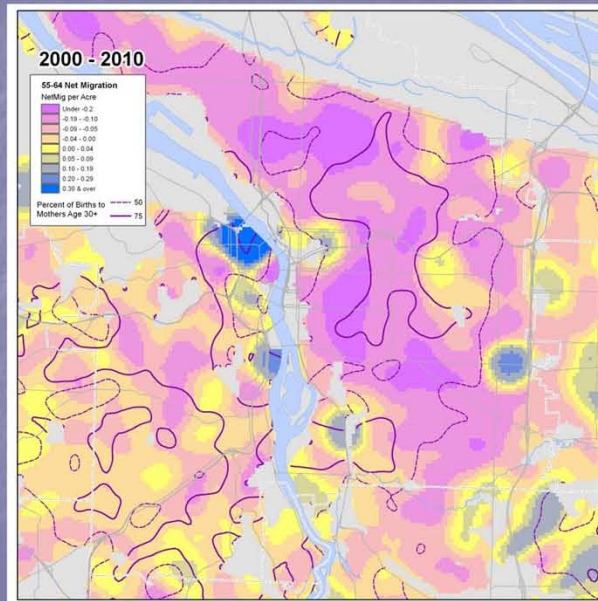
## Turnover of households in the East OMA is infrequent

- While the East OMA is undergoing the process of gentrification, it is an area where households move infrequently.
- Map from tax-lot data showing date since last sale for single family owner occupied dwellings in the District.



## Deaths and out-migration of seniors created opportunities for in-movers

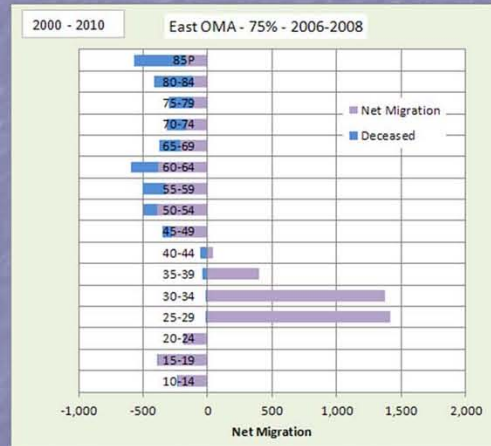
- The older population residing in the East OMA resulted in a deaths which created housing vacancies.
- The number of deaths increased in the 2000-2010 period in the East OMA.
- Out-migration of seniors also provided opportunities for in-movers.
- The opportunities from departing seniors spread out into the East Surround in the 2000-2010 period.





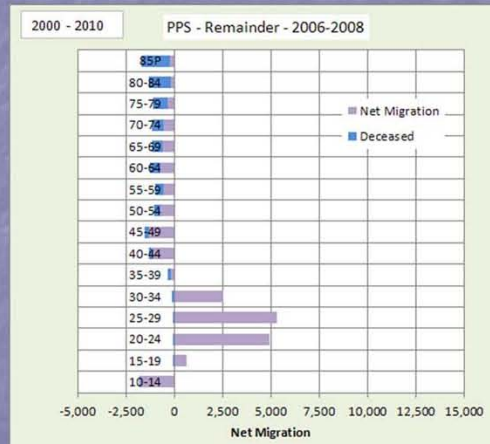
## Estimated Net Migration and Deaths for East OMA Area

- In the core **East OMA** period where the gentrification began in the early 1990s the age 30-49 in-migration was facilitated by the out-migration of young families.
- During the 1998-2001 period some of the in-migration was facilitated by the deaths and out-migration of the age 65+
- By the 2006-2008 period more of the in-migration of the age 25-44 mainly was accommodated by the out-migration of the 50+ and deaths of the 60+



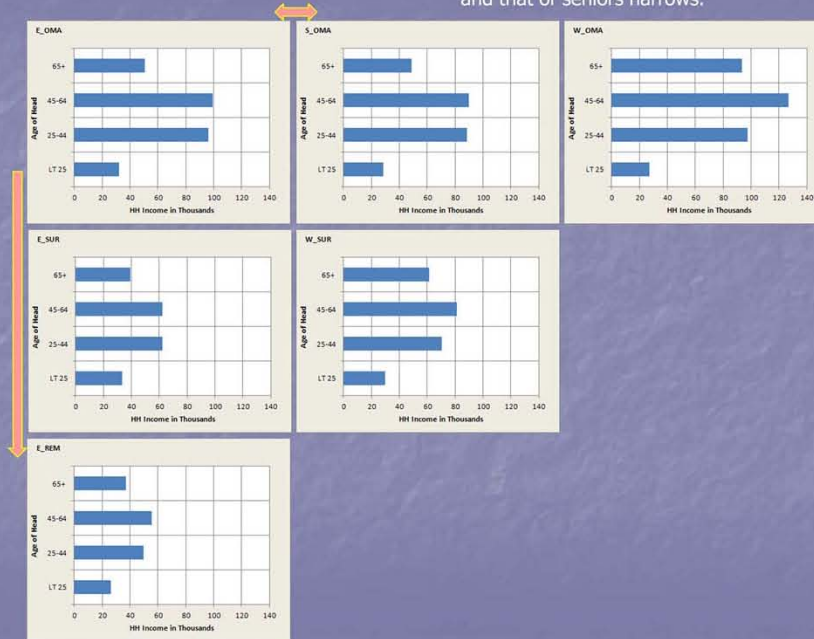
## Comparing East OMA area to surrounding areas

- In-migration of the age 25-44 to the overall **East OMA** was facilitated both by the out-migration and deaths of the old and out-migration of the young.
- In-migration to the **East Surround** involved younger cohorts and space was created by the out-migration of persons age 40 and older and deaths of those 65 and older
- In-migrants to the **PPS Remainder** area were younger than those in the **PPS Surround** and were accommodated by out-migration and deaths in older cohorts.



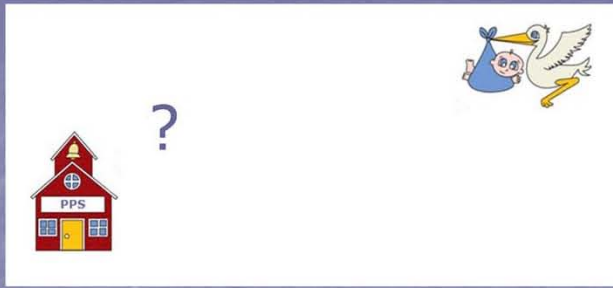
- Income for the age 25-44 in the East and South OMAs nearly double than that for seniors

- As one progresses outwards from the East OMA the differential between incomes for the age 25-44 and that of seniors narrows.



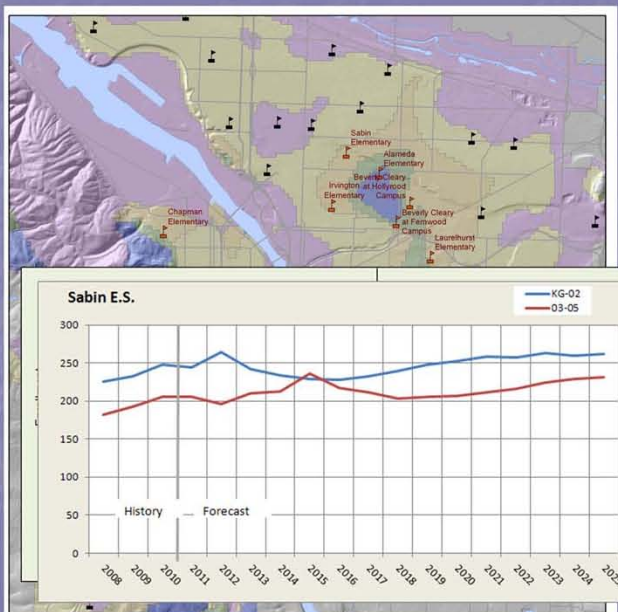
## Did gentrification and births to older moms drive increases in school enrollment?

- Did the older moms deliver?
- Did enrollment increase in elementary schools located in the Older Moms Areas?
- In aggregate did the enrollment growth in the OMAs turn around the enrollment declines in the District?
- How did the spread of gentrification into the East Surround area impact enrollment?



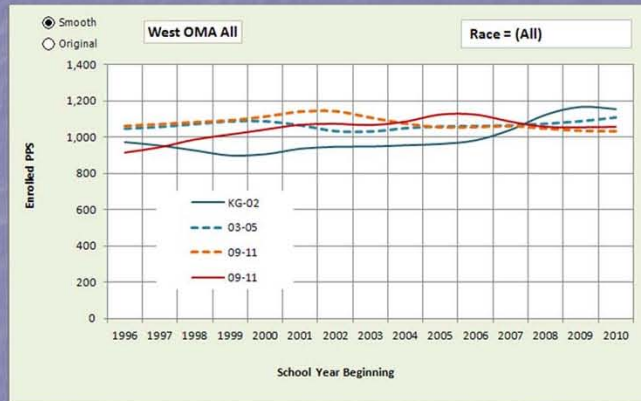
## Enrollment forecasts for schools

- Thirteen of the District's elementary schools were located in the OMA areas, with eight in to the East OMA.
- Our enrollment forecasts sometimes anticipated the impacts of births to older moms, mainly because births from earlier years were included in the forecasting model.
- An example is Sabin Elementary where we show the 2001 and 2011 enrollment forecast.
- In other cases we did not correctly anticipate the impacts of the older moms.



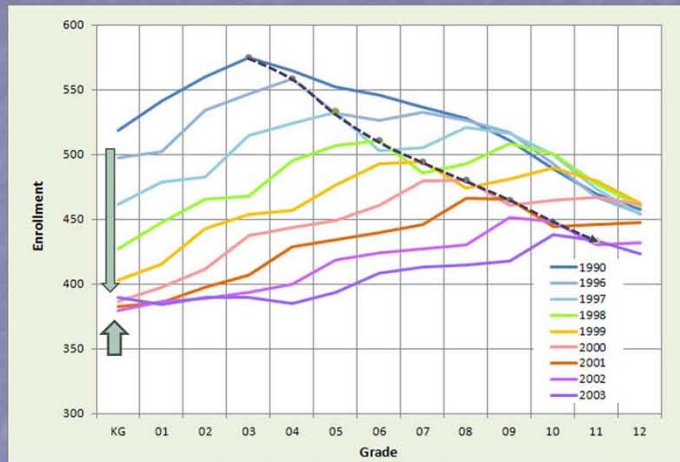
## Enrollment changes by OMA region

- In the East OMA (all three time periods) the KG-02 enrollment began to grow, turn around, in 2001 followed by growth in grades 03-05 in 2004.
- In the South OMA the earlier decline was less pronounced and growth came a few years later.
- In the West OMA a decline was not experienced and the growth in KG-02 was slight.

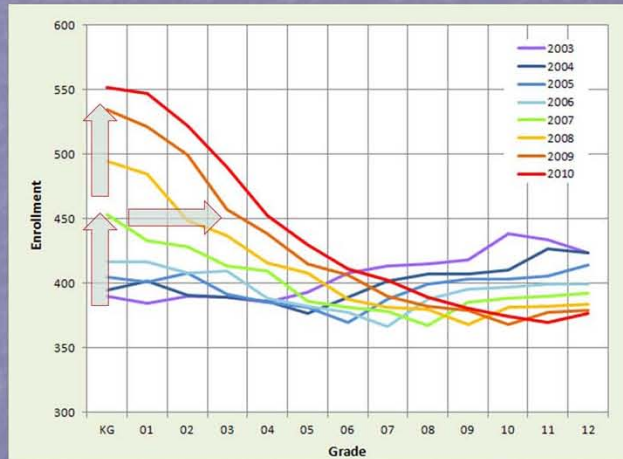


## Summary of enrollment trends in recently gentrifying areas

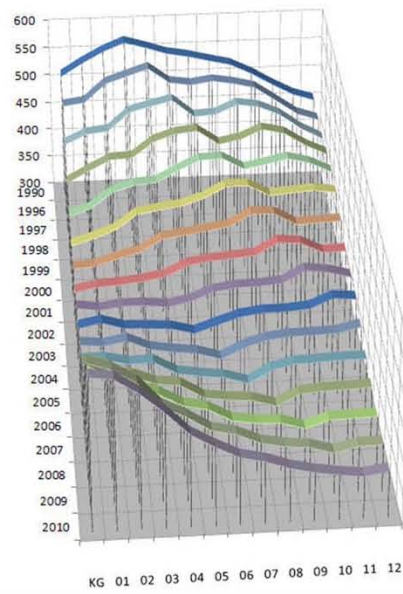
- From 1997 until about 2001 enrollment fell in the lower grades.
- In about 2002 the decline in the lower grades stabilized.
- There was large cohort of 4<sup>th</sup> graders in 1997 that diminished and then graduated in 2004.



- After about 2002 enrollment in the lower grades began to grow
- and grew more rapidly after about 2007
- and progressed into the middle school level



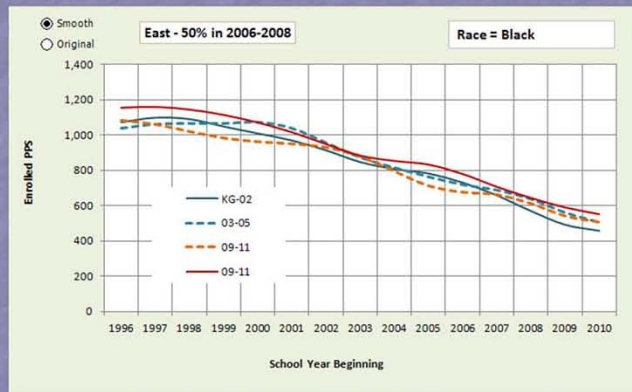




All OMA areas, 2006-2008  
gentrification period

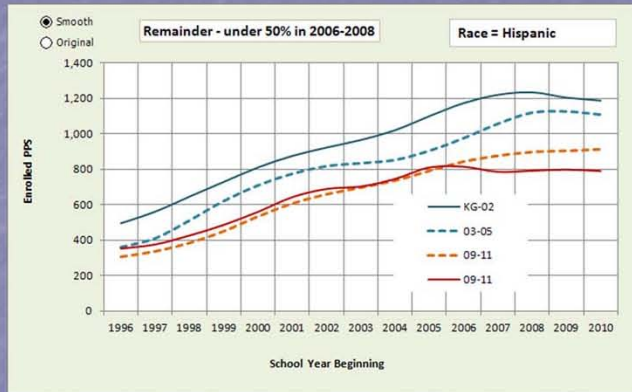
## Enrollment changes in the East Surround

- In the East Surround region enrollment declined for all grade level groups, but showed a slight upturn for KG-02 in about 2005.
- For white students the upturn in enrollments was greater but
- the numbers of Black students declined as Black households moved out of their traditional core area to the east side of the District and beyond.
- The in-migration of the older moms to the East OMA did not displace many Black families as few lived there. However the growth of the older moms population in the East Surround area was linked to the out-migration of black households.



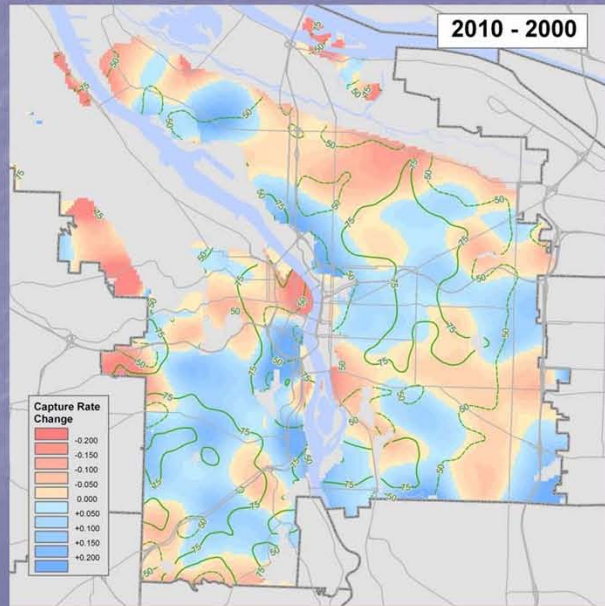
## Enrollment changes in the remainder of the District

- In the Remainder area of the District enrollments in all grades declined from 2000 to 2005 but enrollment in the lower grades turned slightly upward after 2005.
- Enrollment for white students declined sharply until about 2007 when the loss in the lower grades stopped.
- The loss in white students was compensated for by rapid growth in the enrollment of Hispanic students, which flattened out after about 2006.



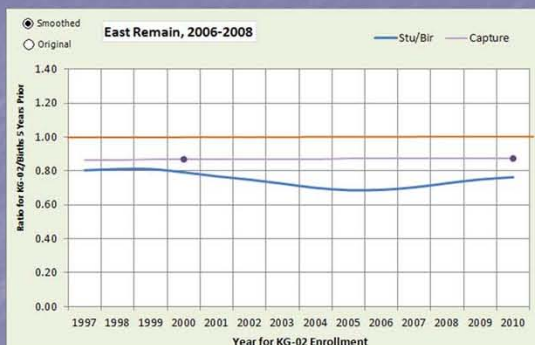
## Decomposition of change into in-migration and capture rates

- The changes in enrollment can be attributed to (1) net in-migration or (2) to changes in the capture rate. The capture rate tends to be high in low income areas and low in high income areas.
- The capture rate in the East OMA rose in the core, and declined along the border. It declined where Black families out-migrated.



## Losses of children from birth to school age

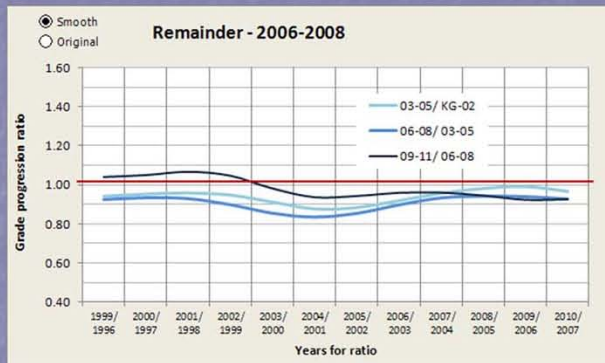
- For the District capture rates declined very slightly from 2000 to 2010. The ratio of KG-02 students to births five years previous dropped after 2000 to just over 0.60 in 2006 then rose slightly.
- The East OMA showed a greater drop in capture rate, due perhaps to rising incomes, but also a sharp upturn in the retention of children born five years earlier.
- The East Surround also showed a slightly declining capture rate and only a slight upturn in the low retention of children born five years earlier.
- The capture rate in the East Remain region did not change over the decade, but the retention of children born five years previous did show improvement after about 2005.

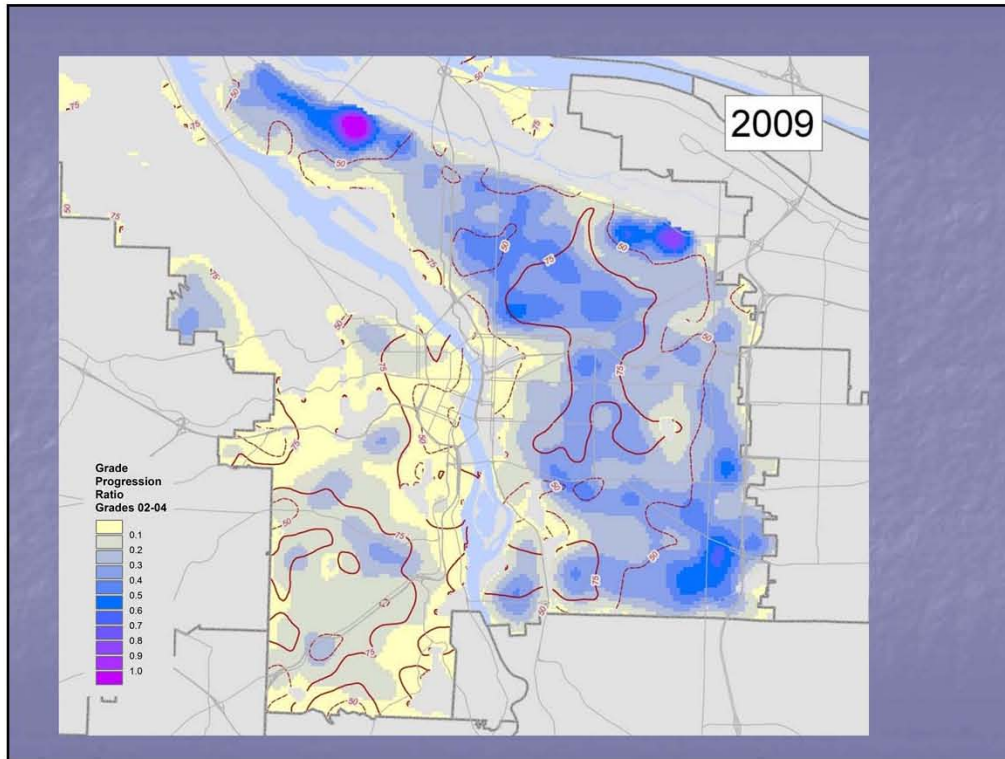




## Retention beyond early grades – grade progression ratios

- Grade progression ratios (GPR) compare the number of students in a grade range, here three years, with the number three years prior.
- For the District the ratios are below 1.0 for all grades.
- For the East OMA the GPR for the lower grades has been above 1.0 for most years and that for the middle and upper grades has risen.
- For the East Surround, the GPR has been below 1.0 for all grades, but has risen in recent years.
- For the remainder of the District the GPR dropped and then rose after about 2004.





## Conclusions

- What kind of gentrification was this?
  - East OMA – Turnover, vacancies from seniors dying or out-migrating but seniors enjoyed lower incomes than the thirty something in-migrants.
  - East Surround – Turnover of seniors, but also out-migration of Black population.
  - Accompanied by commercial gentrification in nearby areas.
- Did the older moms deliver?
  - They brought sufficient enrollment to several schools in the OMA areas to bring them back from the brink of closure.
  - In aggregate they brought enrollment growth to the OMA areas, starting in the lower elementary grades and spreading upwards into the middle school grades.
  - Although capture rates remained steady or dropped slightly in the OMA areas, increased retention from birth to KG and in the lower grades increased enrollment.
- Methods and sources
  - Using the linked birth, student record, and tax-lot data provided fine geographical and temporal resolution.
  - GIS tools for database development and analysis are powerful but time consuming to use.



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